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TURFGRASS RESEARCH REVIEW

How photoperiod, cold treatment affect rhizome and tiller development

Rhizome and tiller development of Kentucky bluegrass (*Poa Pratensis L.*) as influenced by photoperiod, cold treatment and variety.

L. E. Moser, S. R. Anderson and R. W. Miller. 1968. Agronomy Journal. 60:632-635. (from the Department of Agronomy, Ohio State University, Columbus, Ohio 43210).

The affects of photoperiod and cold treatment on the rhizome and tiller development of Merion and Windsor Kentucky bluegrasses were studied in controlled climate chambers. The photoperiods utilized in this study lasted six, 12 and 18 hours. The low temperature treatment was just above freezing.

Although a cold treatment is not essential for lateral shoot development, it did stimulate tillering but reduced the numbers of rhizomes initiated. Longer photoperiods of 16 to 18 hours resulted in increased rhizome initiation and elongation. In comparing the two varieties utilized in this study, Merion tillered more profusely than Windsor but Windsor produced a greater number and length of rhizomes. Tillering was greater under medium photoperiods than under longer or shorter periods of light exposure. Both Merion and Windsor produced about the same number of developed crown buds, but Merion produced a greater number which developed into tillers while Windsor produced a greater number which developed into rhizomes.

Seasonal relationships between nitrogen nutrition and soluble carbohydrates in the leaves of* Agrostis Palustris *Huds and* Poa Pratensis *L.

D.G. Green and J.B. Beard. 1969. Agronomy Journal. 61:107-111. (from the Department of Crop Science, Michigan State University, East Lansing, Mich. 48823).

Toronto creeping bentgrass and Common and Merion Kentucky bluegrass were fertilized at rates of 0, 3, 6, 9 and 12 pounds of nitrogen per 1,000 square feet per year, which were split into six equal applications made at 15 day intervals starting April 15. In a second experiment conducted in mid-August, 0, 6 and 12 pounds of nitrogen per 1,000 square feet were applied to each of the three grasses in a single application. The effect of these nitrogen fertilization treatments on the sucrose, glucose, fructose, fructosan and oligosaccharide contents of the leaf tissue were investigated.

The short chain oligosaccharides containing predominately fructose units were the primary storage carbohydrates in these three grasses and proved most responsive to nitrogen treatments. The oliogosaccharide content decreased as the rate of nitrogen fertilization increased. The nitrogen treatments did not produce significant responses in the sucrose and monosaccharide (glucose and frutose) fractions. The ap-

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plication of more than 1.5 pounds of nitrogen per 1,000 square feet resulted in severely depressed oligosaccharide levels. Based on these carbohydrate responses, no more than 1.5 pounds of readily available nitrogen per 1,000 square feet should be used in any single application.

The common Kentucky bluegrass went into mid-summer dormancy for a period of time. During that period there was no reduction in the oligosaccharide level. However, there was a depletion of the monosaccharides, glucose and fructose, which coincided with the advent of the summer dormancy. A similar response was observed with Pennlawn red fescue.

Comments: A delicate balance exists between the storage carbohydrate level of the turfgrass tissues and the level of nitrogen nutrition. A vigorous, healthy turf should contain a quantity of reserve carbohydrates at all times. This store of food reserves is then readily available to support growth, particularly following environmental stress, disease or insect damage. A rapid recuperative rate from this type of injury is desirable and can best be achieved by utilization of carbohydrate reserves stored within the turfgrass plant.

An excessive amount of nitrogen nutrition which stimulates shoot growth will deplete the carbohydrate reserve. Since the shoot tissues always have priority over the root tissues for any available carbohydrates, there may actually be a restriction and dieback of the root system. In addition, the lack of a carbohydrate reserve will impair the recuperation from injury.

The above study indicates that applications of readily available nitrogen at rates in excess of 1.5 pounds of nitrogen per 1,000 square feet in any application will severely restrict the carbohydrate reserve and should be avoided. □